

## ABSTRACT

The present invention provides processes and equipments for safely and easily preparing an F<sub>2</sub>-containing gas, as well as processes and equipments for surface modification using the F<sub>2</sub>-containing gas prepared.

According to the present invention, a gas containing a fluoro compound that is easier to handle than F<sub>2</sub> is supplied and the fluoro compound is excited and decomposed to convert it into F<sub>2</sub> gas before surface modification and then used for surface modification. According to the present invention, there is no necessity of providing, storing and transporting a large amount of F<sub>2</sub> gas in advance because a necessary amount of F<sub>2</sub> gas is obtained immediately before surface modification.

A process for preparing an F<sub>2</sub>-containing gas comprises the steps of exciting at least one fluoro compound in a fluoro compound-containing gas by conferring energy on the fluoro compound-containing gas under reduced pressure; and partially or completely converting the excited fluoro compound-containing gas containing the excited fluoro compound into F<sub>2</sub> under normal pressure or overpressure.